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ABSTRACT

This study examined students' knowledge associated with AIDS (Acquired Immune Deficiency Syndrome) and attitudes toward AIDS patients in three remote rural Oregon school districts. Subjects were 139 females and 149 males in 7th, 8th, 9th, and 10 grades. The questionnaire used in the study was designed to obtain information concerning knowledge and attitudes in the following areas: (1) modes by which AIDS is transmitted; (2) methods and importance of preventing the spread of AIDS; (3) identifying people with AIDS; and (4) interpersonal relationships with people diagnosed as having AIDS. An additional question addressed the source of student information about AIDS. Data was interpreted for the overall group, as well as for gender and grade. On the Knowledge of Transmission Scale the average percent correct was 84.5, with no significant differences between males and females. The average percent correct for seventh graders was significantly less than that for higher levels. On the Knowledge of Prevention Scale, students scored a mean of 68.6% correct, with significant differences in gender and grade. No gender or grade differences were found on the Recognition of AIDS Scale, with a mean score of 68.8% correct. The scale dealing with Attitudes Towards AIDS Victims yielded a mean score of 73.0%, with a significantly higher mean for females. The school was the most frequently cited source of knowledge about AIDS. Results suggest that schools must provide effective AIDS education to their students. (KS)

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AIDS -- Knowledge and Attitudes of Students in Rural Schools Examined by Gender and Grade Level

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Objectives

The objectives of this descriptive-comparative study were: (1) to assess the knowledge of risk behaviors associated with AIDS, knowledge of transmission modes of the virus, and attitudes toward AIDS patients among students in three remote rural Oregon school districts; (2) to examine student attitudes by gender and grade level and (3) to examine selected relationships among these variables.

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Perspectives

> Education about AIDS should start early in elementary school and at home so that children can grow up knowing the behavior to avoid to protect themselves from exposure to the AIDS virus.
>
> Those of us who are parents, educators, and community leaders, indeed all adults, cannot disregard this responsibility to educate our young. The need is critical, and the price of neglect is high. The lives of our young people depend on our fulfilling our responsibility. (Koop, in The Oregonian, 1987, p.C4)

Identified in the United States for the first time in 1981, the Acquired Immune Deficiency Syndrome (AIDS) is a deadly disease that destroys T-lymphocytes, and therefore the ability of the body's immune defense system to fight various infections,

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including cancer, pneumonia, and meningitis (Surgeon General Koop in The Oregonian, 1987). It is possible to be infected with the AIDS virus and capable of transmitting the disease without exhibiting noticeable symptoms of the disease. Although those who test HIV+ (sero-positive) are infected with the virus, individuals may be infected and contagious but not test positive because antibodies have not yet formed in the blood (McAlister, 1990). The AIDS Related Complex (ARC) is a less severe form of the AIDS disease which may or may not progress to the disease itself. ARC patients are also capable of infecting others with the virus, even before they are aware that they are infected.

As a sexually transmitted disease, AIDS is contagious in a manner similar to other such diseases--gonorrhea, syphilis, etc. The virus is found in all body fluids. However, its level of concentration is quite low in saliva, tears, and sweat; no cases of AIDS being acquired from contact with these fluid have been documented (McAlister, 1990). The primary means by which an exchange of body fluids necessary for transmitting the AIDS virus occurs are: exposure to infected blood, the sharing of intravenous drug needles, sexual contact, and infected mother to her fetus or infant (Preston, Jehu-Shaw, & Zielinski, 1988).

Koop (The Oregonian, 1987, p. C4) said that "AIDS is a life-threatening disease and a major public health issue. . . . By the end of 1991, and estimated 270,000 cases of AIDS will have occurred with 179,000 deaths within the decade since the disease was first recognized." By March 15, 1988, a total of 55,315 adult cases were reported to the Center for Disease Control

(Preston, Jehu-Shaw, & Zielinski, 1988). Adding to this the reports of AIDS from Africa and Europe, AIDS is indeed an international, national, and state problem.

No state escapes this problem, including the one in which this study was done. The HIV Program Manager of the Oregon Health Division reported that, by 1990, there were in excess of 15,000 HIV+ cases in Oregon, with 720 being classified as AIDS patients (McAlister, 1990). With 135 deaths in 1989, AIDS is the 16th leading cause of death in Oregon; however, for young men (ages 25-34), it is third in the ranking (Heinz, 1991). Considering that the number of deaths resulting from AIDS increased 18.4 percent from 1988 to 1989 and that 90% of its victims are young men (Heinz, 1991), it has been said that this disease claims more years of potential life than do diseases such as arteriosclerosis and diabetes.

In 1985, Christopher and Cate reported that the number of pregnancies among teenage girls exceeded 1,000,000 each year and that the premarital intercourse rates are rising above the 70% level for both sexes. By age 19, about 63% of females and 78% of males will have had at least one sexual experience; of those between 12 and 17, 28% are currently active (The National Research Council, 1987). Since AIDS is transmitted sexually, it is critical that this younger age group also receive information about the transmission of AIDS (Preston, Jehu-Shaw, & Zielinski, 1988).

The introduction of sex education into the curriculum (Adame, 1985) has substantially increased student knowledge of

sexuality (Kirby, 1985). Research on its impact on sexual activity has produced mixed results; however, Furstenberg, Moore, and Peterson (1985) did find that youth who had experienced a sex education course had a lower frequency of intercourse than those who had not. Nevertheless, the sexual behavior of adolescents seems to be more influenced by the sexual behavior and attitudes of their friends (Billy & Udry, 1985; Pope, Westerfield & Walker, 1985) than by their religious beliefs or instruction in school (McCormick, Izzo, & Folcik, 1985).

Adolescents in general, and the younger and rural teenager in particular, are uncomfortable about purchasing and ineffective in using contraceptives (McCormick, et al., 1985). Recognizing that adolescents are sexually active, it is not surprising that about one in seven is carrying a sexually transmitted disease (STD). Unfortunately, activities that result in pregnancy and STD's also lead to being infected with AIDS (Mathison, 1986).

Students are especially vulnerable to AIDS when they begin exploring sex or experimenting with drugs. America's teachers make up the only professional, nationally dispersed network that can reach young people before they begin these behaviors. A new era of educating adolescents about healthy sexual and personal attitudes is beginning (The Health Information Network Senior Science Advisory Group, 1987).

If even a small percentage of the more than 7,000,000 teenagers who have experimented with cocaine, heroin, and stimulants have used needles, hundreds of thousands of teenagers may have been exposed to AIDS. Teenagers must be considered to be a high-

risk population. Many of the AIDS cases now diagnosed acquired the disease as teenagers (Mathison, 1986). Considering that 68% of all AIDS cases are in the 20-39 age range and that the incubation period for the virus is in the 2-7 year range, we must conclude that a relatively large number of individuals are becoming infected during their adolescent and college-age years (Goggin, 1988). Furthermore, those students with the least knowledge are also those most likely to engage in high-risk behaviors (Goggin, 1988).

Misconceptions make up a large part of the perceptions of adolescents prior to instruction. These misconceptions interact with instruction, thereby limiting its effectiveness. A study of the effectiveness of AIDS education with metropolitan high school students in Indiana discovered that high school students were reasonably well-informed about AIDS. However, three areas of critical misconceptions were identified: condoms eliminate the risk of AIDS; AIDS is likely to be contracted by casual and indirect contact, such as social kissing and donating blood; and AIDS is transmitted in the schools (McCoy & Calvin, 1989). Social problems in the school are likely to be aggravated by this latter misconception. Nevertheless, secondary and tertiary-level students believe that they are unlikely to contract AIDS (Goggin, 1988; Herting, et al., 1988; Moore, Chia, & Castellow, 1988). It would appear that the media has been somewhat effective in dispensing some factual information, but relating this factual information to personal self-perceptions and practices has not occurred.

In a study of the attitudes of university freshmen in eastern North Carolina, Moore, Chia, and Castellow (1988) found that females were more sensitive than males towards AIDS patients and were more willing to interact with them. Also, they were more likely than males to have changed some of their sexual practices; neither saw themselves at risk for AIDS. Nevertheless, most (80%) agreed that it was necessary to have a national screening program for AIDS. Also, 42% of the males and 31% of the females agreed that an AIDS epidemic in the heterosexual population would justify placing AIDS patients/carriers in camps or colonies; for 13% of the males and 7% of the females, the termination of AIDS patients would then be warranted.

The findings of a study of rural Oregon middle school students by Hales, McGrew, and Nizic-Anderson (1990) are similar to those reported above for university freshmen. Middle school females were found to have more positive attitudes and be more willing to interact with individuals who have AIDS than were the males. Although the question concerning quarantining AIDS patients was not conditional to the spread of AIDS in the heterogeneous population, 35% of the males and 15% of the females favored doing so (an additional 22% and 21%, respectively were undecided). Also, these students seem to confuse sexual practices to prevent pregnancy with preventive practices for AIDS. These findings indicate that AIDS is poorly understood; in order to decrease the possibility of fear and panic, widespread, simple, direct, immediately available educational programs are needed (Moore, Chia, & Castellow, 1988).

A study of West Pennsylvania teens showed that 7th grade students were more effected by an AIDS Education Program that dealt with knowledge and attitudes than were high school students. Providing AIDS education to students prior to their coming to terms with their own sexuality in effect forms attitudes and understandings rather than attempting to change them after they have been formed (Preston, Jehu-Shaw, & Zielinski, 1988).

Apparently, students receive most of their information on AIDS from the mass media [newspapers, magazines, television and radio commercials, and television programs], and the information presented is frequently superficial and provides inadequate information to secondary students (Price, Desmond, & Kukulka, 1985) -- a lack of accurate information could be fatal. However, an AIDS education program for middle and high school students in rural Pennsylvania seem to help reduce their dependency on media, replacing it with teachers (Preston, Jehu-Shaw, and Zielinski, 1988). Partially in response to this danger, there has been a growing recognition by educators, parents, state politicians, advocacy groups, and the Surgeon General of the urgency of introducing effective sex and AIDS education programs in our schools, beginning in the elementary grades.

Oregon public schools are mandated by OAR 581-22-412 to provide age-appropriate curricula for all grade levels on infectious diseases, including AIDS, ARC, HIV, and Hepatitis B. Similar activity is under-way throughout the United States.

Even though AIDS education is a common topic of concern, it is so new that there is little research available on its effectiveness. Much of the discussion has been in the hands of the news media, concerned educators, and other professionals. There has been a lot of sensationalism, but little accurate data. Schools are becoming increasingly involved in AIDS education, and it is important that the effectiveness of the school-based AIDS education programs be evaluated (McCoy & Calvin, 1989).

Methods and Data Sources

The questionnaire used in this study was designed to obtain information concerning the knowledge and attitudes of adolescents in the following areas: modes by which AIDS is transmitted, methods and importance of preventing the spread of AIDS, identifying people with AIDS, and interpersonal relationships with people diagnosed as having AIDS. An additional question addressed the source of student information about AIDS. The format and questions used were influenced by the Oregon State Health Department AIDS Questionnaire and evaluated by school nursing staff, district health educators, and school district administrators.

In May, 1990, it was administered to 7th (N=102), 8th (N=80), 9th (N=69), and 10th (N=37) grade students in three remote rural Oregon school districts. There were 139 females and 149 males. The distributions for grade-level and gender are presented in Table 1.

Table 1. Grade and Gender Distribution of the Student Sample

Variable	Level	Frequency	Percent
Grade	7	102	35.4
	8	80	27.8
	9	69	24.0
	10	37	12.9
Gender	Female	139	48.3
	Male	149	51.7

In constructing this instrument, the primary focus was on obtaining information concerning specific knowledge and attitudes of rural school children concerning AIDS; no attempt was made to construct a balanced, summative instrument. A subsequent examination of the instrument suggested that, with the exception of one question, each question could be scored on the basis of its agreement with the current knowledge-base in the field or recommend sexual/social practice, thereby permitting the creation of a summated total scale score. Since the instrument physically does not appear to be a test and students were not told to attempt each item, the treatment of blank items as "incorrect responses" is questionable. One solution to this problem would be to score "blanks" as "undecided." An alternative is to remove the influence of blanks by dividing the sum of the item scores by the number of items attempted and then to multiple this average by the number of items on the scale (29 in this case); this is the procedure used in this study. Further examination of the research instrument suggested that it could be partitioned into four somewhat different but related subscales: perceptions of the

modes of transmitting the AIDS virus (12 items); perceptions of methods of preventing the spread of the AIDS virus (10 items); perceptions of the ability to recognize people with AIDS (2 items); and attitudes concerning relating with people who have the HIV virus (5 items). Using the scaling procedure described for the total scale, scale scores were calculated for students on each of the above four subscales.

Item responses were summarized with descriptive statistics, primarily percentages. An analysis of variance approach was used to estimate the internal reliability of each scale (four subscales and total scale). Descriptive statistics were calculated for the scales, including means and standard deviations. Relationship between selected questions were also investigated, using Spearman's rank order coefficient of correlation. A multivariate factorial analysis of variance was performed, using grade and gender as independent variables and the subscales as dependent variables. A factorial analysis of variance was also performed on the total scale. Subsequently univariate analyses of variances were examined for gender and grade for each scale. Finally, analysis of variance was used to examine the scale differences associated with student perceptions of their primary source of information about AIDS. The .05 level was used for each inferential statistical test.

Results and Conclusions

The primary purpose of this study was to examine the perceptions of rural secondary school students concerning AIDS; therefore, the responses of the total sample are examined first and in

greater detail than one would likely encounter in a causal-comparative study. Following this presentation is a discussion of the results of the various comparative analyses.

Total Sample

As indicated in Table 2, rural 7th-10th grade students were generally aware that the AIDS virus is spread by direct sexual contact: **man to woman** (96%), **woman to man** (86%), and **man to man** (83%). In the area of what might be considered to be by blood contact, they were aware that the virus is spread through the sharing of **intravenous needles** (99%). However, the spread from infected **mother to unborn child** was not as well recognized (78%), and with 13% undecided, their confidence in their knowledge was less. They correctly included **receiving infected blood** as a means by which AIDS is spread (97%) but failed to adequately differentiate this from simply **receiving blood and blood products** (62%). They tended to exclude **donating blood** as a means of becoming infected (30%, yes). Although today both giving and receiving blood is considered to be low risk, the virus has been spread by both means (using infected needles in the case of giving blood) and a rather large number of hemophiliacs have been infected by transfusions.

Students tended to view **kissing** as not being a means by which the virus is spread (78% no). Because the mucous membranes of the mouth is sensitive to the AIDS virus and blood may be present in irritated gums, etc., it is possible for the virus to be spread by kissing, but it is relatively low risk. Thus, their perceptions are reasonably consistent with current thought.

Table 2. Perceptions of Modes of Transmitting the AIDS Virus

Question	N	Percent		
		Yes	Undec.	No
Direct Sexual/Physical Contact				
High Risk				
1. Man to woman by sexual contact.	288	95.5	3.1	1.4
2. Woman to man by sexual contact.	287	86.1	6.3	7.7
5. Man to man by sexual contact.	287	83.3	9.8	7.0
Moderate Risk				
9. Kissing.	287	8.0	13.6	78.4
Blood Contact (Direct Nonsexual)				
High Risk				
3. Sharing intravenous needles.	288	98.6	0.7	0.7
4. Mother to unborn child.	288	77.8	12.9	9.4
8. Receiving infected blood.*	288	96.5	1.0	2.4
Low Risk				
7. Donating blood.	287	30.3	7.7	62.0
12. Receiving blood and blood products.	288	61.5	20.5	18.1
Indirect Contact				
Low Risk				
6. Sharing living quarters.	287	1.4	4.5	94.1
10. Being near someone with AIDS.	287	2.4	1.7	95.8
11. Having someone with AIDS sneeze or cough near you.	288	5.9	14.9	79.2

*Recent changes in medical practices has reduced the risk associated with receiving blood.

In regard to two of the three indirect contact, low risk statements, few students considered them to be means of transmitting AIDS: **sharing living quarters** (1% yes; 94% no) and **being near someone with AIDS** (2% yes; 96% no). They were less sure that **having someone with AIDS sneeze or cough near you** (15% undecided; 79% no) would not result in getting AIDS. In comparison with the previous study of rural Oregon middle school children (Hales, McGrew, & Nizic-Anderson, 1990), these students were more knowledgeable of the modes of transmitting AIDS; the biggest change was in the recognition that AIDS can be transmitted by mother to unborn child. These differences may be the result of more class time devoted to AIDS education or simply because this study has 7th-10th graders instead of 7th-8th graders.

Spearman coefficients of correlation among these items are shown in Table 3. Two clusters of significant correlations emerged. The correlations among high-risk factors (questions 1, 2, 3, 4, 5, & 8) were positive and tended to be significant, indicating some consistency in their responding to these high risk statements. (Please note that **receiving infected blood** is considered to be high risk in this analysis because of the wording of the statement and the publicized AIDS infections by transfusion during the period of this study.) However, **4. Mother to unborn child** exhibited a significant correlation with only two of the high risk statements (**1. Man to woman by sexual contact** and **5. Man to man by sexual contact**), indicating that the responses

Table 3. Spearman Rank Order Coefficients of Correlation among Perceptions of the Modes of Transmitting AIDS.

Question	Question										
	2	5	3	8	4	6	10	11	9	7	12
1	+.38*	+.13*	+.26*	+.15*	+.22*	-.16*	-.04	-.08	-.14*	-.14*	+.02
2		+.17*	+.12*	+.09	+.04	-.07	+.04	-.06	+.02	-.14*	+.02
5			+.12*	+.17*	+.28*	-.13*	-.14*	-.08	-.05	-.18*	+.02
3				+.31*	+.08	-.22*	-.13*	-.01	-.17*	-.17*	+.08
8					+.08	-.11	-.25*	+.01	-.25*	-.01	+.10
4						-.00	-.13*	-.15*	-.07	-.20*	+.23*
6							+.31*	+.31*	+.28*	+.12*	+.06
10								+.34*	+.34*	+.17*	+.03
11									+.44*	+.18*	+.05
9										+.16*	+.05
7											+.22*

*Significant at the .05 level.

to this statement were less related to how students responded to other high risk statements.

Likewise, with the exception of **12. Receiving blood and blood products**, the correlations among moderate and low risk factors (questions 6, 7, 9, 10, 11, & 12) were positive and significant, indicating some consistency in responding. However, **12. Receiving blood and blood products** was significantly related to only one low risk statement (**7. Donating blood**).

Of the 36 correlations between high and low/moderate risk statements, 27 were negative (with 16 being significant). All

but three of the positive correlations involved 12. **Receiving blood and blood products**, and it was significantly related to 4. **Mother to unborn child.**

As presented in Table 4, these rural, school youth considered it to be quite important to consider AIDS when starting a new sexual relationship (89%, very important; 10%, somewhat important).

Table 4. Importance for an Individual to Consider AIDS when Starting a New Sexual Relationship (N = 277)

Importance Category	Percent
13. Very Important	89.2
Somewhat Important	10.1
Not too Important	0.4
Not Important at all	0.0
Undecided	0.4

The perceptions of rural school students concerning the importance of various suggested practices for reducing the spread of the AIDS virus are presented in Table 5. Approximately 44% of the students said that to **abstain from sex** was not an important means of prevention in combating the spread of AIDS; 35% considered it to be important and 21% were undecided. Although medically the most effective means of prevention, it is unlikely to be practiced by most young adult and adult population; therefore, the rejection of this option by a majority of the respondents seems to be realistic. Over 96% of the students considered the use of **condoms** to be an important means of preventing the

Table 5. Student Perceptions of Methods of Preventing the Spread of the AIDS Virus

Question	N	Percent		
		Import.	Undec.	Not Impt.
Effective Methods				
18. Abstain from sex.	288	35.1	20.8	44.1
15. Use condoms.	287	96.2	2.4	1.4
20. Never touch someone else's blood.	285	50.2	18.3	31.6
21. Use rubber gloves when giving first aid.	288	68.8	9.7	21.5
Moderately Effective Methods				
14. Reduce the number of sexual partners.	285	75.8	9.8	14.4
17. Be selective in choosing sexual partners.	288	88.5	3.8	7.6
Ineffective Methods				
16. Use a diaphragm.	284	55.6	22.2	22.2
19. Use birth control pills.	285	35.1	20.8	44.1

Write-in Responses		
Do not share needles.	14	26.4
Have blood test for AIDS.	12	22.6
Sex only with people you know.	5	9.4
Hospital handling of blood.	3	5.7
No homosexual sex.	3	5.7
Be careful	3	5.7
Limit number of sexual partners.	3	5.7
Partner limits sexual contacts.	2	3.8
Be knowledgeable about AIDS.	2	3.8
Wash hands after first aid.	2	3.8
No oral sex.	1	1.9
Get checked for VD monthly.	1	1.9
Not being blood brothers.	1	1.9
Don't worry if they get AIDS.	1	1.9

spread of AIDS. The less effective methods of being selective in choosing sexual partners (89%, important) and reducing the number of sexual partners (76%, important) were rated lower on the importance scale in keeping with their lesser value in preventing AIDS. Although valuable as secondary practices in combating AIDS, neither provide sufficient protection to be safely used alone. Unfortunately, although not clearly documented by the questions asked, it is reasonable to infer that a sizable portion of those considering these to be important methods of prevention would consider it appropriate to use such a method as the sole means of prevention. This interpretation gains support from the noticeable number who consider two ineffective means of prevention as important: use a diaphragm (56%) and use birth control pills (35%). When the undecided choices are taken in account (22% and 21%, respectively), these figures become even more alarming. Although 69% of the respondents considered it to be important to 21. use rubber gloves when giving first aid, only 50% agreed that it was important to 20. never touch someone else's blood. With 22% and 32%, respectively, considering these practices to be unimportant, it would appear that these students do not really understand the risk of getting AIDS by blood contact.

In contrast with the earlier rural middle school study (Hales, McGrew, & Nizic-Anderson, 1990), students in this sample were more inclined to rate as important the following generally effective methods of preventing the spread of AIDS: abstain from sex (35% vice 27%); use condoms (96% vice 87%); reduce the number of sexual partners (76% vice 63%); and be selective in choosing

sexual partners (89% vice 80%). However, they were also more likely to rate as important two ineffective methods: **use a diaphragm** (56% vice 50%) and **use birth control pills** (35% vice 31%). These differences may be the result of grade level differences in the two samples or to greater class discussion of AIDS. For what ever reason, these students were more aware of safe practices for preventing AIDS but were also more inclined to extend methods for preventing pregnancy to AIDS prevention. This inappropriate generalization can be fatal.

Students were asked if they had other precautions to suggest. Their responses are also indicated in Table 5. About 15% made one or more suggestions. About 50% of the free responses related to not sharing needles and trying to establish that a potential sexual partner is AIDS free.

Students perceptions of the reliability of the AIDS test for selecting sexual partners is presented in Table 6. About 15% indicated that they did not believe that it would be safe to have sexual relations with someone who had tested negatively on the AIDS test; 33% thought it would be safe and an additional 50% thought it might be safe. Students need to be better informed in this area.

The relationships among statements 13-21, 25 and 26 are presented in Table 7. Questions 13 (pertaining to the importance of considering AIDS in establishing a sexual relationship) was not significantly related to any of these statements. Given the homogeneity of the responses to this statement, this is not a surprising outcome. Questions 25 and 26 (pertaining to the

Table 6. Student Perceptions of the Reliability of the AIDS Test for Safely Selecting Sexual Partners

Question	N	Percent			
		Yes	May	Und.	No
If a person had evidence that he/she had tested negatively for AIDS, meaning that there was no indication of the disease					
25. Do you think that it would be safe for someone to have sexual relations with that person?	285	33.3	49.8	1.8	15.1
26. Do you think that other people might choose to have sexual relations with that person anyway?	283	66.1	--	25.1	8.8

Note: Yes (Safe); No (Not Safe); May (Maybe); Und. (Undecided)

safety of sex with someone who has tested negatively for AIDS) were significantly related to each other but to none of the other statements. The largest correlation (significant and positive) was between statements 20. **Never touch someone else's blood** and 21. **Use rubber gloves when giving first aid**; they were both related significantly and positively to 17. **Be selective in choosing sexual partners** and 20 was similarly related to 18. **Abstain from sex.** Question 14 (**reduce the number of sexual partners**) was positively and significantly correlated with 17. **Be selective in choosing sexual partners** and 18. **Abstain from sex**; although also positive, the correlation between 17 and 18 was not significant. Statement 16. **Use a diaphragm** and 19. **Use birth control pills** were significantly and positively related, but they were negatively (and significantly) related to 18. **Abstain from**

Table 7. Spearman Rank Order Coefficients of Correlation among Perceptions Concerning AIDS Prevention.

Question	Question									
	14	15	16	17	18	19	20	21	25	26
13	+.09	-.01	+.01	+.05	+.09	-.01	+.06	-.05	-.05	-.08
14		+.01	-.04	+.18*	+.28*	-.19*	+.06	+.02	-.01	+.03
15			+.16*	+.15*	-.00	-.05	+.11	+.03	-.08	+.01
16				+.01	-.21*	+.12*	-.09	-.05	-.01	-.04
17					+.11	-.17*	+.17*	+.13*	+.06	+.10
18						-.12*	+.13*	+.09	-.07	-.06
19							-.06	-.02	-.04	-.03
20								+.38*	-.08	-.02
21									-.01	-.04
25										+.14*

*Significant at the .05 level.

sex; and the relations of 19 with 14 and 17 were significant and negative. The correlations of Statement 15 (use condoms) with 17 (be selective in choosing sexual partners) and 18 (use a diaphragm) were significant and positive. These significant relations exhibited by question 16 were in the wrong direction, unless one were to consider using a diaphragm as a means of preventing getting the AIDS virus. Of the 55 correlations, there were 14 significant ones. The correlations among these statements suggests that students are confusing safe sex (i.e., reduc-

ing the risk of pregnancy) with practices which help prevent the spread of AIDS.

These rural, secondary school children were not confident of their ability to recognize someone with the HIV virus (no--72%, undecided--20%). They also suspected that those who could transmit were unaware that they could (49% indicated that less than one-half could and an additional 23% indicated that only one-half could). See Tables 8 and 9. These figures suggest that these students are cognizant that HIV+ people are not easily recognized nor do they necessarily know that they are carriers.

Table 8. Student Perceptions of the Ability to Recognize People Infected with the HIV Virus

Question	N	Percent		
		Yes	Undec.	No
24. Based upon the information you now have,do you feel confident that you could identify someone who could infect you with AIDS?	286	8.7	19.6	71.7

Table 9. Student Perceptions Of The Extent To Which People Who Can Transmit AIDS Know That They Could Give Someone AIDS (N = 284; Item 27)

Response	Percent
None	1.8
Very Few	46.8
Half	22.5
Most	19.7
Undecided	9.2

As presented in Table 10, in considering ways of relating to people with AIDS, 18% favored quarantining, 19% were undecided. Although quarantining was less acceptable in this study than in the one by Moore, Chia, and Castellow (1988), it should be noted that the question in the earlier study was conditional (if AIDS were to become an epidemic.)

Students were willing to be in class with an AIDS student (69%), have a teacher with AIDS (61%), and continue a best-friend relationship with an AIDS patient (82%). Thus, they were more

Table 10. Student Perceptions of Ways of Relating with People with the HIV Virus

Question		N	Percent		
			Yes	Undec.	No
28.	Do you believe AIDS patients should be quarantined, or in some other way be separated from the rest of the population?	284	18.0	18.7	63.4
29.	Would you willingly go to school or be in a class with a student you know has AIDS?	284	69.4	20.8	9.9
30.	Would you willingly take a class from a teacher who has been diagnosed with AIDS?	284	60.9	23.6	15.5
31.	Would you continue being friends if your best friend were to be diagnosed with AIDS?	284	81.7	14.8	3.5
32.	Would you continue to see your boyfriend/girlfriend if he/she were diagnosed with AIDS?	284	26.1	44.0	29.9

inclined to continue a relationship with a friend than to permit a more casual classmate or teacher relationship. They were far less inclined to continuing a boyfriend/girlfriend relationship (26% said yes, 30% said no). When compared with the study of rural middle school children (Hales, et al., 1990), with the exception of the boyfriend/girlfriend relationships (which saw an increase in the undecided category of 2% at a cost to the other two), these respondents were more positive; in the original study, 24% favored quarantining, 68% would be in class with an AIDS student and 53% with a teacher, and 71% would continue being friends with an AIDS patient. These differences may reflect the differences in grade levels of the two studies (7th & 8th in the original and 7th-10th in the present) and/or more class time expended on AIDS as a result of the state mandate.

The relationships among these variables is presented in Table 11. The correlations of the quarantine question with the responses to the other questions were negative and significant at or beyond the .05 level; those favoring quarantining AIDS patients were less willing to associate with people with AIDS, whether a teacher, classmate, best-friend, or girlfriend/boyfriend. In examining the correlations among the peer relationship questions, all were positive and significant at or beyond the .05 level; students who would accept a classmate with AIDS tended to accept continuing a relationship with a best-friend or boyfriend/girlfriend, and those who would continue a relationship with a best-friend with AIDS tended to be more positive to a girlfriend/boyfriend with AIDS than those who would not continue a best-friend relationship.

Table 11. Spearman Rank Order Coefficients of Correlation among Perceptions Concerning Relating to People with AIDS.

Question	Question				
	28	29	30	31	32
28. Do you believe AIDS patients should be quarantined or in some other way be separated from the rest of the population?		-.44*	-.45*	-.29*	-.29*
29. Would you willingly go to school or be in a class with a student you know has AIDS?			+.72*	+.53*	+.34*
30. Would you willingly take a class from a teacher who has been diagnosed with AIDS?				+.46*	+.38*
31. Would you continue being friends if your best friend were to be diagnosed with AIDS?					+.35*
32. Would you continue to see your boyfriend/girlfriend if he/she were diagnosed with AIDS?					

*Significant at the .05 level.

The means, standard deviations, and internal consistency coefficients of reliability for the four scales and the total scale are presented in Table 12. The means were 32.3 (84.5% correct) for Knowledge of Transmission (of AIDS), 26.8 (68.6% correct) for Knowledge of Prevention (of AIDS), 5.4 (68.8% correct) for Recognition of AIDS (patients), 12.3 (73.0% correct) for Attitudes Toward Aids Victims, and 76.7 (75.4% correct) for the Total Scale. The coefficients of reliability ranged from .44

on the Recognition scale to .63 on the Attitudes scale; it was .75 for the Total Scale.

Table 12. Scale Means, Standard Deviations, and Reliability

Scale	Mean	Standard Deviation	Percent Correct	Coefficient Alpha
Knowledge of Transmission	32.27	2.73	84.5	.606
Knowledge of Prevention	26.77	3.13	68.6	.476
Recognition of AIDS	5.44	1.43	68.8	.440
Attitudes Toward AIDS Victims	12.25	2.51	72.5	.634
Total Scale	76.74	5.72	75.4	.747

As indicated in Table 13, when asked where they acquired their knowledge about AIDS, the most frequent response was school (50%), with TV being next (25%), and parents, third (9%). Newspapers and church together accounted for only one percent. Although the directions called for a single choice, 13% made multiple marks. When multiple selections were counted, the percentages changed some, mainly in favor of parents. Since, at the time of this study, schools were under a recent state mandate to have an AIDS education program, it is likely that AIDS was discussed in some classes. This is a change from the rural middle school study in which TV (47%) was the first choice and School was second (22%).

Table 13. Primary Sources of Student Knowledge about AIDS (Question 23; N = 276)

Source	Single Choice Marks		Counting Multiples	
	Frequency	Percent	Frequency	Percent
School	137	49.6	161	51.6
TV	69	25.0	89	28.5
Parents	25	9.1	42	13.5
Friends	6	2.2	4	1.3
Newspaper	3	1.1	11	3.5
Church	0	0.0	5	1.6
Multiple Marks	36	13.0		
Write-in Responses				
Books	6	17.1		
Magazines	5	14.3		
Pamphlet (mail)	4	11.4		
Radio	4	11.4		
TV	2	5.7		
Hot Line	2	5.7		
Teachers	2	5.7		
Parents	3	8.6		
Relatives	1	2.9		
Named Individual	2	5.7		
Personal Research	2	5.7		
Everywhere	1	2.9		
Myself	1	2.9		

Few students elected to offer free responses. Of those who did, 20% of the choices repeated choices available in the structured part of the item. Most of the unique choices were books, magazines, and radio (43%). Others indicated a mailed pamphlet (11%), probably the Surgeon General's pamphlet.

Although clearly less so than in the previous study of rural middle school children (Hales, et al., 1990), the pattern of responses indicates that the knowledge of these students is somewhat shallow and narrow in focus, reflecting that which is conveyed in TV commercials. Depending on the statement, 78% to 99% were aware that AIDS is transmitted by direct sexual contact, receiving infected blood, infected mother to child, and sharing needles and not transmitted by casual contact -- content available in TV commercials. However, an examination of the pattern of this knowledge suggests that many students lack a real understanding of the relation of body fluids to the spread of the virus. For example, 96% recognized the **man to woman** risk, but only 86% recognized the **woman to man** risk and even less (83%) recognized the **man to man** risk. In regards **mother to unborn child** (78%) and having **someone cough on you** (79% no), they exhibited greater misinformation. Similarly, they correctly recognized the value of condoms (96%), but had serious misconceptions of the value of diaphragms (56%) and birth control pills (35%) and placed lesser value on abstinence (35%) and reducing the number of sexual contacts (76%). On the first aid related statements, only half recognized the wisdom of not touching **someone else's blood** and 69% indicated that wearing **rubber gloves** was important. Their responses to the coughing/sneezing question (79% no) are a good indicator of their perceptions on the relationship items. With the exception of an altruistic response to continuing a best-friend relationship (82%), approximately one-third of the students preferred limited contact with AIDS patients at school.

Scales Analyzed by Grade and Gender

Gender and grade-level scale means and standard deviations are presented in Table 14. On the Knowledge of Transmission scale, the means for males and females were 32.3 and 32.3, respectively; for seventh, eighth, ninth, and 10th grade students they were 31.0, 33.3, 32.5, and 33.4, respectively. On the Knowledge of Prevention scale, the means for males and females were 26.4 and 27.1, respectively; they were 25.6, 27.2, 27.5, and 27.8 for 7th, 8th, 9th, and 10th grade students, respectively. On the Recognition of Aids scale, the means for males and females were 5.4 and 5.4, respectively; for 7th, 8th, 9th, and 10th grade students, they were 5.3, 5.5, 5.5, and 5.6, respec-

Table 14. Scale Means and Standard Deviations by Gender and Grade

Scale	Mean						Standard Deviation					
	M	F	7	8	9	10	M	F	7	8	9	10
Knowledge of Transmission	32.3	32.3	31.0	33.3	32.5	33.4	2.7	2.8	3.0	2.2	2.3	2.3
Knowledge of Prevention	26.4	27.1	25.6	27.2	27.5	27.8	3.1	3.1	3.2	3.0	2.5	3.5
Recognition of AIDS	5.4	5.4	5.3	5.5	5.5	5.6	1.5	1.4	1.5	1.4	1.4	1.5
Attitudes Toward AIDS Victims	11.7	12.8	12.1	12.2	12.1	13.0	2.7	2.1	2.5	2.5	2.8	2.0
Total Scale	75.9	77.7	74.0	78.1	77.6	79.7	5.6	5.8	4.7	5.6	5.0	6.8

tively. On the Attitudes toward Aids Victims, the male and female means were 11.7 and 12.8, respectively; for 7th, 8th, 9th, and 10th grade students, they were 12.1, 12.2, 12.1, and 13.0, respectively. On the Total Scale, the male and female means were 75.9 and 77.7, respectively; for 7th, 8th, 9th, and 10th grade students, they were 74.0, 78.1, 77.6, and 79.7, respectively.

A factorial multivariate analysis of variance (MANOVA) was performed, with grade and gender as independent variables and the subscales as dependent variables; a separate factorial univariate analysis of variance (ANOVA) was performed on the Total Scale. The results for the MANOVA are presented in Table 15. The statistical hypothesis for the grade by gender interaction was not rejected for the multivariate case (Wilks' lambda = 0.937; p = .120). Therefore, interaction was not considered in the subsequent univariate analyses. The statistical hypothesis for grade was rejected for the multivariate case (Wilks' lambda = 0.798; p = .000). The statistical hypothesis for gender was rejected (Wilks' lambda = 0.915; p = .000).

Table 15. MANOVA Results for Grade and Gender

Effect	Wilks'lambda	F	df	Probability
Grade by Gender	0.937	1.495	12, 722	.120
Grade	0.798	5.349	12, 722	.000
Gender	0.915	6.300	4, 273	.000

The results of the univariate ANOVAs for gender are presented in Table 16. The statistical hypothesis that the means for males and females are equal was not rejected for two scales: Knowledge of Transmission ($F = 0.06$; $p = .814$) and Recognition of AIDS ($F = 0.54$; $p = .476$). The statistical hypothesis that the means for males and females are equal was rejected on two scales: Knowledge of Prevention ($F = 8.81$; $p = .003$) and Attitudes toward AIDS Victims ($F = 16.60$; $p = .000$). Females exhibited greater knowledge of methods for preventing the spread of AIDS and greater empathy toward AIDS victims, as indicated in the more positive scores on the Attitudes scale, than did males. These results are similar to those reported by Moore, Chila, and Castellow (1988); females in that study were found to be more sensitive than males toward AIDS' patients and more willing to interact with them. In comparison with the rural middle-school study, the responses of these students were more appropriate across all scales and for both genders; in both studies, females were more willing to interact with AIDS patients.

Table 16. Analysis of Variance for the Scales by Gender

Variable	Source	SS	df	MS	F	p
Knowledge of Transmission	Between	0.359	1	0.359	0.056	.814
	Within	1782.088	276	6.457		
Knowledge of Prevention	Between	77.914	1	77.914	8.808	.003
	Within	2441.572	276	8.846		
Recognition of AIDS	Between	1.103	1	1.103	0.541	.476
	Within	563.344	276	2.041		
Attitudes--AIDS Victims	Between	99.409	1	99.409	16.604	.000
	Within	1652.470	276	5.987		

The results of the univariate ANOVAs for grade level are presented in Table 17. The statistical hypothesis that the means across the grade levels are equal was not rejected for two scales: Recognition of AIDS ($F = 0.34$; $p = .793$) and Attitudes toward AIDS Victims ($F = 0.60$; $p = .617$). The statistical hypothesis that the means across grade levels are equal was rejected on two scales: Knowledge of Transmission ($F = 14.70$; $p = .000$) and Knowledge of Prevention ($F = 7.59$; $p = 000$). Using

Table 17. Analysis of Variance for the Scales by Grade Level

Variable	Source	SS	df	MS	F	p
Knowledge of Transmission	Between	284.661	3	94.887	14.696	.000
	Within	1782.088	276	6.457		
Knowledge of Prevention	Between	201.491	3	67.164	7.592	.000
	Within	2441.572	276	8.846		
Recognition of AIDS	Between	2.109	3	0.703	0.344	.793
	Within	563.344	276	2.041		
Attitudes-- AIDS Victims	Between	10.739	3	3.580	0.598	.617
	Within	1652.470	276	5.987		

Tukey's HSD for all pair-wise mean comparisons on the Knowledge of Transmission scale, three of the six comparisons were found to be statistically significant at the .05 level. The means for 7th-grade students were lower than the means for 8th-grade ($p < .01$), 9th-grade ($p < .01$), and 10th-grade ($p < .01$) students.

Using Tukey's HSD for all pair-wise mean comparisons on the Knowledge of Prevention scale, three of the six comparisons were found to be statistically significant at the .05 level. The

means for 7th-grade students were lower than the means for 8th-grade ($p < .05$), 9th-grade ($p < .01$), and 10th-grade ($p < .01$) students.

The means and standard deviations for male and female students within grade levels are presented for the Total Scale in Table 18. For the 7th grade, the means were 74.2 and 73.7, respectively; for the 8th grade, they were 77.2 and 79.6, respectively; for the 9th grade, they were 76.9 and 78.4, respectively; and for the 10th grade, they were 75.4 and 82.3, respectively. Across grade levels, the male and female means were 75.9 and 77.7, respectively. Across gender, the 7th, 8th, 9th and 10th grade means were 74.0, 78.1, 77.7, and 79.7, respectively.

Table 18. Means and Standard Deviations for the Total Scale by Gender and Grade Level

Grade	Mean			Standard Deviation		
	Male	Female	Total	Male	Female	Total
7th	74.23	73.73	73.99	5.06	4.43	4.75
8th	77.15	79.59	78.13	5.54	5.41	5.59
9th	76.88	78.39	77.65	4.85	5.07	4.99
10th	75.43	82.25	79.67	7.65	4.75	6.80
Total	75.88	77.66		5.56	5.77	

The results of the factorial ANOVA for the Total Scale are presented in Table 19. The statistical hypotheses for interaction ($F = 4.49$; $p = .004$), gender ($F = 14.83$; $p = .000$), and grade level ($F = 14.74$; $p = .000$) were rejected.

Table 19. Analysis of Variance by Gender and Grade Level for the Total Scale

Effect	Source	SS	df	MS	F	p
Grade by Gender	Between	362.013	3	120.671	4.486	.004
Grade	Between	1188.973	3	396.324	14.735	.000
Gender	Between	398.892	1	398.892	14.831	.000
	Error	7531.021	280	26.897		

Although the main effects for gender and grade level were rejected for the Total Score, with female students scoring higher than male students and 7th graders scoring lower than the other grade levels, the rejection of the statistical hypothesis for interaction indicates that the gender differences are somewhat grade dependent. Therefore, t-tests were performed for each grade level, with gender as the independent variable and Total Scale as the dependent variable.

The hypothesis that male and female means are equal was not rejected for 7th-grade ($p = .600$), 8th-grade ($p = .056$), and 9th-grade ($p = .211$) students. It was rejected for 10th grade students ($p = .002$); the mean for females was higher than that for males. (See Table 20.) An examination of grade level differences by gender shows that the means for both groups increased from 7th grade to 8th grade, with greater improvement being demonstrated for females. However, the means for both groups decreased slightly between 8th and 9th grade, continuing the

Table 20. Student t-Tests for the Total Scale by Gender Within Each Grade Level

Grade	Calculated t	df	Probability
7	0.526	100	.600
8	1.943	78	.056
9	1.262	67	.211
10	3.357	35	.002

downward trend in the 10th grade for males but not for females. This may be no more than a sampling idiosyncrasy, but it could indicate an attitudinal shift associated with maturation-linked changes in sexual identity.

An analysis of variance was performed for each gender, using grade level as the independent variable and Total score as the dependent variable. As can be seen in Table 21, the statistical

Table 21. Analyses of Variance for the Total Scale by Grade Level Within Each Gender

Gender	Source	SS	df	MS	F	prob.
Male	Between	259.724	3	86.575	2.911	.037
	Within	4311.672	145	29.736		
Female	Between	1379.697	3	459.899	19.285	.000
	Within	3219.348	135	23.847		

hypothesis that all population grade-level means are equal was rejected for males ($F = 2.911$; for 3, 145 df, $p = .037$) and females ($F = 19.285$; for 3, 135 df, $p = .000$). Using Tukey's HSD for all pair-wise mean comparisons on the Total scale, none of the six comparisons for males was found to be statistically significant at the .05 level; four of the comparisons were significant for females. For females, the mean for the 7th grade was significantly less than the means for the other grade levels ($p = .000$ for each test) and the 9th-grade mean was significantly lower than the 10th-grade mean ($p = .020$). It would appear that the significant grade-level main effect is more the result of grade-level differences in responses of female students than of male students.

Summary Statement

Over 83% of the middle school students were aware that AIDS is spread by direct sexual contact, with the lowest level of awareness being **man to man.** They were well aware that they can get AIDS by **receiving infected blood** (97%) and **sharing intravenous needles** (99%). They were slightly less aware of **mother to unborn child** risk (78%). For **receiving blood and blood products** (62%) and **donating blood** (30%), they exhibited greater error and uncertainty. Neither **sharing living quarters** (1%) nor **being near someone with AIDS** (2%) were seen as a means by which the virus is transmitted. However, **having someone with AIDS cough or sneeze near you** was viewed as safe by a considerably smaller number (21% were either uncertain or thought that AIDS could be spread in this manner). This pattern of knowledge may reflect

the attention given to the transmission of AIDS by TV, a major source of information about AIDS for these students. Nevertheless, these students were more knowledgeable than those in the Hales, et al. (1990) rural middle school study, perhaps because of a greater influence of the school in the current study. Males and females did not differ significantly on the Knowledge of Transmission scale; the mean for 7th graders was significantly less than the means for all other grade levels.

In regard to preventing the spread of AIDS, 44% did not consider abstinence as important; 21% were undecided. Only 76% perceived reducing the number of sexual partners as important; 89% saw being selective in choosing a partner as important and 89% saw considering AIDS when starting a new sexual relationship as very important. Nevertheless, they did not feel confident that they could recognize someone who could infect them with AIDS. However, to each statement, their responses were more appropriate than were those in the earlier study (Hales, et al., 1990).

For preventing AIDS, using condoms (96%), using a diaphragm (56%), and using birth control pills (35%) were thought to be important; for the latter two, 22% and 21%, respectively, were undecided. In reference to the effectiveness of the AIDS test in selecting a sexual partner, 33% agreed and 52% were undecided. A greater number of these respondents, in comparison to the middle school respondents (Hales, et al., 1990), correctly recognized that condoms provide some protection, but incorrectly placed greater faith in birth control pills, diaphragms, and the AIDS

test. These misconceptions may be partially a reflection of inappropriate generalization from sex education. In any event, these conceptual errors can be fatal.

Both gender and grade differences were found on the Knowledge of Prevention Scale. The mean for females was greater than the mean for males and the mean for 7th graders was lower than all other grade level means. There were no significant gender and grade level differences on the Recognition of AIDS scale.

In considering ways of relating to people with AIDS, 18% favored quarantining, 19% were undecided. Students were willing to be in class with an AIDS student (69%), have a teacher with AIDS (61%), and continue a best-friend relationship with an AIDS patient (82%). In regard to continuing a boyfriend/girlfriend relationship, 26% said yes, 44% were undecided. Those favoring quarantining AIDS patients were less willing to associate with people with AIDS, whether a teacher, classmate, best-friend, or girlfriend/boyfriend. In comparison with the previous study (Hales, et al., 1990), the responses to all but one statement were more positive. They were less likely to continue a boyfriend/girlfriend relationship. This change may simply be the result of using an older sample. On the Attitudes toward AIDS Victims scale, the mean for females was significantly greater than the mean for males; grade level differences were not significant.

Examining males and females separately, the statistical hypotheses that grade level means on the Total scale were rejected; in the pair-wise comparison of means, the mean for the 7th grade girls was significant less than the other female grade

level means. Examining grade levels separately, the only gender difference found was for the 10th grade; the mean for females was higher than the mean for males.

Importance of the Study

About 50% of the students indicated that the school was the major source of their knowledge (or misinformation) about AIDS; 25% credited TV. This is nearly an exact reversal of the results of the middle school study (Hales, et al., 1990). At least in this rural area, the school is now seen as the chief source of information about AIDS for most students. Since an improvement in student knowledge is accompanied with this shift, one might suspect that instruction in school is beginning to have some influence on student knowledge about AIDS. Of particular concern, however, is the confidence that these respondents exhibited in birth control devices which offer no protection against AIDS. In the area of attitudes, the school seems to have less of an impact. Although slightly improved, the differences between the respondents in the two studies were relatively small. Therefore, if the school is to provide instruction which impacts student knowledge, attitudes and behavior, educators responsible for curricular planning and delivery must carefully consider the pattern of knowledge and misconceptions of the transmission and prevention of AIDS and attitudes toward relationships with AIDS patients. Although these results are most applicable to rural

Oregon schools, they do suggest that schools must provide effective AIDS education to their students, hopefully supplemented by other social agencies -- failure to do so may indeed be fatal to a large number of teenagers.

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